Milford Fire Department

Fire Cistern Requirements

April 1, 2010

I. Applicability

A. These requirements shall apply to all new commercial developments and residential subdivisions that are not served by municipal water and/or not having adequate water to provide year round fire protection as determined by the Fire Chief or designee.

II. Permits

A. A permit to install shall be obtained from the installation of each cistern. The permits shall be obtained from the Milford Fire Department.

B. A fee of 75.00 dollars for each permit shall be paid at the time of application.

III. Plans

A. Four (4) sets of plans, including manufacture literature shall be submitted for each cistern to be installed for review and approval by the Milford Fire Department. The plans shall include the following:

- Must be signed and stamped by a NH registered professional engineer.
- Cistern Design in accordance with Milford Fire Department Requirements, NFPA 1142, UL and ASTM standards.
- Site plan showing the location of cistern and easement for cistern maintenance and possible future removal. Easement shall be a minimum of ten (10') feet on all sides. All easements shall also be on file with the Community Development Office and Planning Board.

IV. Cistern locations

A. All cisterns shall to be in place and **fully operational** prior to any combustible materials being stored on site or building permits being issued. For developments that are built in phases, fire cisterns shall be in place and fully operational for the phase currently under development, prior to combustible materials being stored on site.

B. The location of ALL cisterns shall be reviewed and approved by the Fire Department prior to the installation of any cistern as part of an approved site or subdivision plan. Any cistern that is installed prior to the approval of the Fire Department or installed in the wrong location shall be excavated, removed and installed in the proper location unless approved by the Fire Chief and Planning Board as necessary. The work shall be done by a qualified technician and the complete cost of this work shall be borne by the contractor, developer and/or owner.

C. Cisterns shall be located no more than 2000 feet truck travel distance from the nearest lot line of the furthermost lot, spaced every 2000 feet throughout the development. The spacing of cisterns may be increased or eliminated if the contractor, developer and/or owner installs an NFPA 13,13R or 13D compliant sprinkler system in the facility or individual houses within the development. Adjustments to the cistern spacing requirement may be made by the Fire Chief or designee on a case by case basis.

D. The contractor, developer and/or owner shall be responsible for annual maintenance of all cisterns including, but not limited to snow removal, until the roadway is officially accepted by the Town of Milford. If not maintained, the Town of Milford reserves the right to bill the contractor, developer and/or owner for maintenance or snow removal.

V. Vehicle Pad

A. The vehicle pad and approach shall be constructed of a hard, all weather surface such as bituminous pavement or concrete, meeting NHDOT standards and Town of Milford requirements.

B. The vehicle pad shall be of sufficient length to permit easy access to Suction and Fill piping when the fire apparatus is set forty five (45°) degrees to the road.

C. The pitch of the shoulder and vehicle pad from the edge of the pavement to the pumper suction connection shall be one percent (1 %) to six percent (6%) downgrade.

D. A no parking sign shall be placed at the vehicle pad.

VI. Cistern Specifications

A. All cisterns shall be single wall fiberglass or precast concrete.

B. The minimum size capacity for a fire cistern shall be 30,000 gallons.

C. All cisterns shall be trouble free and carry a lifetime warranty of 50 years.

D. All cisterns shall be capable of flowing 1000 gpm for 75% of the cistern capacity.

E. Protection from vehicular traffic shall be provided for all cisterns. Bollards shall be placed along the entire length of the vehicle pad. Bollards shall be a minimum of steel, concrete reinforced 8" diameter. Bollard shall be painted with a rust inhibitor and then painted red.

F. Both Suction and Fill piping shall be supported by either the top of the tank or below the frost line.

G. All horizontal piping shall be pitched towards the tank to allow for drainage.

H. All exterior piping shall be painted with a rust inhibitor and then be painted red.

I. A metal hydrant marker outfitted with white reflective tape shall be installed on the suction pipe.

J. The draft pipe shall be supplied with an anti-vortex plate a minimum of sixteen square inches (16" x 16"). The anti-vortex plate shall be attached to the bottom of the tank , a minimum of six (6") inches off of the tank floor.

K. All cisterns are to be designed so they will not float when empty. This shall be shown on the plans submitted.

L. The bottom of the suction piping to the pumper connection shall not exceed fourteen (14') vertical feet in distance.

M. Vent Pipe will be three (3") inch Schedule 40 Steel Pipe. The pipe will have a bug resistant screened opening and will be positioned to minimize condensation buildup. The height of the vent pipe is to be determined by approved submittal drawings.

N. Fill Pipe will be four (4") inch Schedule 40 Steel Pipe. The fill pipe will terminate above the tank with a four (4") inch Storz connection with cap. The pipe shall be thirty six (36") inches above grade.

O. The suction pipe will be six (6") inch Schedule 40 Steel Pipe. Above the tank the pipe will remain vertical until a ninety (90°) degree long sweep establishes a horizontal direction. The height of the suction pipe above the cistern is to be 36" above finished grade. The pipe will then be reduced to a final four and a half (4 ½") inch National Hose male thread and must be capped. Inside the cistern the suction pipe will extend to six (6") inches of the floor of the cistern. The taper of the pipe shall not allow air bubbles to form.

P. The elevations of all cistern piping are based on the finished grade of the approach and vehicle pad which must be shown on the submitted plans.

1. **Precast Reinforced Concrete Cisterns**

- All precast reinforced cisterns shall be waterproofed in accordance with manufacturer's specifications and these requirements.

- The entire cistern shall be rated for highway loading.

- Surface Loads: Tank shall withstand surface H-20 axle loads when properly installed according to manufacturer's installation instructions.

2. **Single Wall Fiberglass Cisterns**

- All single wall fiberglass cisterns shall be installed in accordance with manufacturer's specifications and these regulations.

- The entire cistern shall be rated for highway loading.

VII. Backfill of Tanks

A. All construction, backfill and grading material shall be in accordance with proper construction practices and acceptable to the Fire Chief or designee.

B. Bedding for the cistern shall consist of a minimum of twelve (12") inches of $^{3}/_{4}$ inch to $1^{1}/_{2}$ inch crushed, washed stone, compacted. No fill can be used under the stone.

C. All backfill material must be screened gravel with stones not larger than $1^{1}/_{2}$ inches and must be compacted to ninety five(95%) percent in accordance with ASTM D 1557, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.*

D. All tanks will be backfilled with a one (1') foot blanket of clean sand around all sides the top of the cistern.

E. Backfill over the tank must have one of the following characteristics:

- Minimum four feet (4') of fill.
- The top and highest two feet (2') of sides of the cistern shall be insulated with vermin-resistant foam insulation and two (2') feet of fill.
- All backfill shall extend ten feet (10') beyond the edge of the cistern, and have a maximum of 3:1 slope, loamed and seeded.

VIII. Inspections

A. All inspections shall be performed by the Town of Milford Inspecting Engineer or designee and coordinated through Milford Fire Department

B. Inspections shall include the following:

- Rough excavation
- Tie down or strapping inspection
- Backfill Inspection
- Random compaction test
- Finish inspection
- Leakage test
- Fire Department Conditional Acceptance Test

IX. Testing

A. After backfilling of the tank and manway, and miscellaneous piping is installed, the fire cistern tank shall be leakage tested. The tank must be filled with potable water to within 1 inch of the top cover of the manway. The installer may allow the filled tank to sit for one (1) day prior to commencement of the test. The test duration will be seven (7) calendar days. The tank level

measurements will be made and recorded by the Town of Milford's Inspecting Engineer or designee. The installer must provide the specified lock and key for use by the Town of Milford's Inspecting Engineer or designee, and the Milford Fire Department to secure the manway cover. The test is a zero leakage test. If after the seven day test leakage is verified, the tank and or components must be repaired to stop the leak. Any repairs made must be in accordance with manufacturer's specifications and acceptable to the Fire Department. Any repairs made to the tank must be done with prior written recommendation by the tank's manufacturer.

B. The Fire Department shall conduct a final Conditional Acceptance Test of the cistern which will consist of a fire apparatus pump pulling and maintaining a draft from the cistern for two (2) cycles of five (5) minutes each.

C. Refilling of the tank with potable water is the responsibility of the contractor, developer and/or owner. Tank shall remain filled once tested and accepted.

D. Once the final Conditional Acceptance Test has been successfully completed the Fire Department will conditionally accept the cistern. This conditional acceptance shall remain in place until the roadway is accepted by the Town of Milford.

E. The contractor, developer and/or owner shall be responsible for annual maintenance of all cisterns including, but not limited to snow removal, until the roadway is officially accepted by the Town of Milford. If not maintained, the Town of Milford reserves the right to bill the developer, contractor and/or owner for maintenance or snow removal.

Milford Fire Department Fire Cistern Inspection Sign Off

ALL FIRE DEPARTMENT INSPECTIONS SHALL BE SCHEDULED A MINIMUM OF 24 HOURS IN ADVANCE. ALL 3RD PARTY INSPECTIONS SHALL BE SCHEDULED A MINIMUM OF 48HOURS IN ADVANCE.

Cistern location: _____

Manufacture: _____

	Date	Performed by	Approved/Not Approve d
Excavation Inspection:			
Tie down Inspection:			
Finish Inspection:			
Backfill Inspection:			
Random Compaction Test:			
Leakage Test:			
Flow Test:			
Conditional Acceptance:			
Final Acceptance:			

Final acceptance of the cistern is granted upon acceptance of the road by the Town of Milford. Conditional acceptance will be granted upon successful completion of the Flow Test.

Town of Milford, NH

FIRE CISTERN INSTALLATION PERMIT

Parcel ID: Map_____ Lot_____
❑ Paid with Permit ❑ Amount _____ ❑ Cash ❑ Check # _____ Office Use Only

❑ Single wall fiberglass ❑ Precast reinforced concrete

Location Of Work:	
Property Owner:	Owner's Phone #:
Description of Work:	

Make of Appliance:	
Size:	Location:

REQUIRED INFORMATION

Installer Name:		Daytime Phone #:	
Company:		Phone #:	
Address:	City:	State:	Zip:

Please submit 4 sets of plans.

Approved By: _____Date: _____
Milford Fire / Building Official

24 HOUR NOTICE Required for Fire Department inspections

(603) 249-0680